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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/658,597
Filing Date: September 09, 2003
Appellant(s): KEHRLI, ARNOLD P.

Frank R. Occhiuti
OCCHIUTI ROHLICEK & TSAO LLP
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed December 23, 2008 appealing from the Office action mailed June 10, 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

2003/0183410	SINHA ET AL.	10-2003
6,344,956	MORITA	2-2002

5,878,334	TALISA ET AL.	5,878,334
JP 11122793 A	SHIMOMURA	4-1999
5,420,495	HINGORANI	5-1995
4,045,823	PARTON	8-1977
2002/0005668	COUTURE	1-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3, 5, 7, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sinha et al. (2003/0183410) and Morita (6,344,956). Sinha teaches first and second transmission lines in parallel, and the second line including a superconductor ([0134]; Fig. 29). It is also inherent that the second impedance characteristic is less than the first, based on the superconductor (also see [0144]). He also teaches the superconductor being a cold-dielectric high temperature superconductor (Fig. 5). He also teaches a refrigeration system for cooling the high temperature superconductor ([0137]). Sinha fails to teach the use of a power flow controller, which is a reactor. Morita teaches a power flow controller, which selectively controls the magnitude of the power flowing through a superconductor during normal operating conditions to provide flow optimization, where the controller could be a reactor. Morita also

teaches the power flow controller being configured to restrict a total amount of current allowed to pass through the transmission line while maintaining a superconductive state. Morita also teaches the power flow controller, which can increase its resistance level when the current through a superconductor exceeds a critical level. This increase in resistance limits the current (and in turn, the power) by an incremental and variable amount depending upon the amount of current that was flowing initially and the increase in resistance level (Col. 1, lines 35-59; Col. 8, lines 30-36). It would have been obvious to one of ordinary skill in the art at the time of the invention to add a reactor onto the superconductor transmission line of Sinha's invention to regulate the power flow through the line and also reacts quickly to short-circuit accidents.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sinha et al. (2003/0183410) and Morita (6,344,956) as applied to claims 1 and 3 above, and further in view of Talisa et al. (5,878,334). Sinha teaches a superconductor being an oxide (Abstract), but fails to specify exactly what type of oxide superconductor. Talisa teaches the use of a high temperature superconductor made of Tl-Ba-Ca-Cu-O. It would have been obvious to one of ordinary skill in the art at the time of the invention to use Talisa's superconductor in Sinha's invention since it is known in the art and the exact type of superconductor that Sinha describes isn't explicitly known.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sinha et al. (2003/0183410) and Morita (6,344,956) as applied to claim 1 above, and further in view of Shimomura et al. (JP 11122793A). Sinha and Morita teach a multi-line power transmission system. Neither reference explicitly teaches what the first transmission line is made of. Shimomura teaches a power transmission line which is a cross-linked polyethylene power

transmission line (USE). It would have been obvious to one of ordinary skill in the art at the time of the invention to implement this transmission line into Sinha's invention since it is known in the art as a working power transmission line that carries high voltages and Sinha doesn't teach a specific type in his invention.

7. Claims 8-9 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sinha et al. (2003/0183410) and Morita (6,344,956) as applied to claim 1 above, and further in view of Hingorani (5,420,495). Sinha and Morita teach a multi-line power transmission system. Neither reference explicitly teaches a bi-directional power flow controller which is also a phase angle regulator. Hingorani teaches a bi-directional power flow controller which also regulates and controls the phase angle (Col. 2, lines 45-47, 58-60). It would have been obvious to one of ordinary skill in the art at the time of the invention to implement this controller into Sinha's invention so that the operator can have more control over the flow of power in the system.

8. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sinha et al. (2003/0183410) and Morita (6,344,956) as applied to claim 1 above, and further in view of Parton (4,045,823). Sinha and Morita teach a multi-line power transmission system. Morita fails to explicitly teach his power flow controller comprising a plurality of reactors. Parton teaches a power flow controller comprising a plurality of reactors configured to limit the amount of current flowing through a superconductor. He also teaches the power flow controller configured such that a desired impedance characteristic can be achieved by activating/deactivating one or more of the reactors. (Abstract; Col. 1, lines 11-37) It would have been obvious to one of ordinary skill in the art at the time of the invention to implement Parton's power flow controller into the

combined Sinha/Morita invention since his controller performs the same function as desired and is more explicit in the performance of his current limiting device.

9. Claims 10, 11, 13-14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sinha et al. (2003/0183410), Morita (6,344,956) and Hingorani (5,420,495). Sinha teaches first and second transmission lines in parallel, and the second line including a superconductor ([0134]; Fig. 29). It is also inherent that the second impedance characteristic is less than the first, based on the superconductor (also see [0144]). He also teaches the superconductor being a cold-dielectric high temperature superconductor (Fig. 5). He also teaches a refrigeration system for cooling the high temperature superconductor to keep it in a specified operating range ([0137]). Sinha fails to teach determining and regulating the level and amount of power flow through the second transmission line. Morita teaches a current limiting element (power flow controller) coupled to a superconductor, which selectively regulates the power flowing through the superconductor during normal operating conditions to provide flow optimization. Morita also teaches the current limiting element, which can increase its resistance level when the current through a superconductor exceeds a critical level. This increase in resistance limits the current (and in turn, the power) by an incremental and variable amount depending upon the amount of current that was flowing initially and the increase in resistance level (Col. 1, lines 35-59; Col. 8, lines 30-36). Hingorani teaches a bi-directional power flow controller which determines and regulates the power flowing in the transmission line (Col. 2, lines 45-47, 51-55). It would have been obvious to one of ordinary skill in the art at the time of the invention to implement Morita's power flow controller with the bi-directional characteristic of Hingorani's controller on the

superconducting line of Sinha's invention so that the operator can have more control over the flow of power in the system.

10. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sinha et al. (2003/0183410), Morita (6,344,956) and Hingorani (5,420,495) as applied to claim 10 above, and further in view of Shimomura et al. (JP 11122793A). Sinha, Morita, and Hingorani teach a multi-line power transmission system. Neither reference explicitly teaches what the first transmission line is made of. Shimomura teaches a power transmission line which is a cross-linked polyethylene power transmission line (USE). It would have been obvious to one of ordinary skill in the art at the time of the invention to implement this transmission line into Sinha's invention since it is known in the art as a working power transmission line that carries high voltages and Sinha doesn't teach a specific type in his invention.

11. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sinha et al. (2003/0183410) and Morita (6,344,956) as applied to claim 1 above, and further in view of Couture (2002/0005668). Sinha and Morita teach a multi-line power transmission system as described above. Neither reference explicitly teaches the power flow controller providing a desired impedance characteristic to provide load balancing between the two conductors. Couture teaches a power flow controller that modifies the impedance on various transmission lines in a network to provide load balancing between transmission lines (Abstract; [0004]). It would have been obvious to one of ordinary skill in the art at the time of the invention to implement the ability of Couture's power flow controller to modify the impedance on various lines, into the Sinha/Morita combination's power flow controller to provide a safer and more stable network.

(10) Response to Argument

Regarding the three main points, which are relevant to claims 1, 10, and 23, the Examiner believes that Morita teaches a power flow controller (i.e. current limiter/reactor) that performs in the same way as the power flow controller in the Appellant's invention. On page 7, lines 13-18, of the Appellant's specification, it teaches the power flow controller being a reactor that limits "the amount of current that can flow on a line…by adding their own impedance to the line's normal impedance." This is precisely what Morita's power flow controller does as well. For example, when the current flowing in Morita's superconductor exceeds a critical level, the resistance (i.e. impedance) level in the superconductor is increased, which subsequently decreases the current flowing through the superconductor (Col. 1, lines 47-55).

The Examiner would like to note, as he did to the Appellant in his previous Office Action, that the term "normal operating conditions" is very broad. That term could mean, "whenever current is flowing through said superconductor," and that is how the Examiner interpreted that limitation. Therefore, Morita's power flow controller does selectively regulate the power flowing through said superconductor during normal operating conditions. Also, Morita teaches instances when his power flow controller selectively regulates the power (Col. 6, lines 33-45).

Also, as can be seen in Fig. 10 of Morita, reference number 66 shows how the current is being selectively regulated by Morita's power flow controller. Since the slope of the curve of 66 is not constant, one could say that it is being regulated by a *variable amount*.

Also, regarding the phrase, "changing the flow of current incrementally," one may think of "incrementally" being successive steps, however, as described in the Appellant's specification

(page 8, lines 6-15) and as seen in the Appellant's equation of Power (line 3), one could see that the Appellant's Power (and also Current) graphs would look similar to 66 of Morita's Fig. 10. Therefore, the Examiner believes that, based on the way that the Appellant is using the term "incrementally", one would say that Morita's power flow controller also changes the flow of current incrementally.

Regarding the argument that the combination of Sinha and Morita is not obvious, Appellant argues that they were the first to appreciate, in such an arrangement, the advantages of coupling a power flow controller to a superconductor. Some of those advantages being load balancing and/or flow optimization. The Examiner would argue that these advantages were obvious to one of ordinary skill in the art at the time the present invention was made. Also, the Appellant argues (at the top of pg 13 of the Appeal Brief) that it is not obvious because such a configuration could reduce the proportion of power flowing through the second (superconducting) cable, which the Examiner believes isn't a valid argument since that is what the power flow controller's main function is (to reduce/limit the power flowing through the second cable). Also, Morita does teach his power flow controller being coupled to a superconducting cable. Therefore, the Examiner believes that it would be obvious to one of ordinary skill in the art to couple the power flow controller of Morita to the superconducting cable of the Sinha invention.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Dru Parries

/Richard Elms/ 3.19.09

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